

Overview

Product description

HP Serviceguard for Linux ProLiant Cluster is a high availability solution that leverages the strength of HP's experience in the HA business, bringing the best-in-class mission critical HP-UX technologies to the Linux environment and ProLiant servers. The cluster kit includes high availability software that provides critical applications the high availability that enterprise customers require for 24x7 business operations. It is designed to protect applications from a wide variety of software and hardware failures, monitoring the health of each server (node) and quickly responding to failures including system processes, system memory, LAN media and adapters, and application processes. Serviceguard for Linux enables customers to cluster HP ProLiant server family of with shared storage from HP Smart Array Cluster Storage to HP StorageWorks disk arrays in a 2-node SCSI or 2 to 16-node Fibre Channel configuration.

What's New

Updated server support list.

Ordering Information

HP Serviceguard for Linux ProLiant Cluster (2 node license cluster kit)	305199-B22
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HP Serviceguard for Linux	307754-B22
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(single license version for ordering flexibility and to ease ordering for larger cluster, also available through product number B9903BA on product line 1X; your HP salesperson or HP reseller will determine appropriate product number)

- Software updates are distributed by HP Services to customers with support contracts
- Application toolkits can be downloaded from <http://www.software.hp.com>
- For additional information on other HP High Availability products and services for ProLiant, visit <http://www.hp.com/servers/proliant/highavailability>

NOTE: These Web sites are available in English only.

Product Highlights

HP Serviceguard for Linux ProLiant Cluster Benefits

Maximize service uptime, ensure data integrity and minimize planned downtime

With HP's robust high availability software, Serviceguard for Linux

Sophisticated heterogeneous cluster management and investment protection

Administer, monitor and manage both Linux and HP-UX clusters with Serviceguard Manager intuitive GUI integrated with other HP management tools

Designed, developed, delivered and supported by HP

With HP as the single point of contact, there is no single point of failure

HP Serviceguard for Linux ProLiant Cluster Capabilities

Increase overall cluster availability with fault resilient ProLiant servers

ProLiant quality and innovations provide maximum redundancy and fault-resilience across processor, disk, memory, power, cooling and I/O subsystems. Configurations of HP Serviceguard for Linux ProLiant Cluster are completely tested and qualified on ProLiant servers across multiple applications.

Greater protection over typical failover cluster configurations

HP Serviceguard for Linux uses additional hardware paths and software techniques to keep the application running on the same node and "failing over" to a new node as a last resort.

Ensure data integrity by eliminating "split-brain syndrome"

Quorum service support allows the use of an external server or PC to act as an external arbitrator in the event that all network connections between the cluster nodes fail. The quorum service can monitor a total of up to 100 nodes in up to 50 heterogeneous HP-UX and Linux Serviceguard clusters.

Perform online reconfigurations

Reconfigure cluster nodes and packages and optimize your cluster performance without taking down the cluster.

Rolling upgrades eliminate downtime for upgrades

Allows software and hardware upgrades while the cluster remains up and running.

Workload allocation maintains performance levels

Applications can be configured to fail over to multiple nodes to minimize impact on the surviving nodes.

Disaster protection through stretch clustering

HP's optional stretch cluster software, HP StorageWorks Cluster Extension, integrates with Serviceguard for Linux enables disaster tolerance on XP storage ensuring automatic failover across large geographical distances enabling access to critical data during disasters or major site outages.

Accelerate your Linux capabilities ahead of the competition

With operational features almost exactly the same as HP Serviceguard for HP-UX, you can easily integrate Linux clusters with common components and IT knowledge. You can prepare now to take advantage of the cost and control benefits of Linux more quickly.

Protect your existing storage investment

Serviceguard for Linux utilizes the HP VA, EVA, and XP storage you may have in your current environment, allowing cost-effective migration of HP-UX and Windows® platforms to Linux® high availability solutions or integration into your multi-OS

Product Highlights

SAN environment.

Full solution support

As solid as the cluster itself, HP is solely accountable to you for all aspects of the solution, eliminating wasted time determining accountability among suppliers.

Rigorous testing, qualification, and support

HP conducts extreme stress and destructive testing based on best practices and standards to ensure that Serviceguard for Linux clusters will maintain the highest levels of availability for your mission critical applications.

Maintain highest levels of quality service

HP offers a comprehensive portfolio of support services to meet any level of service agreement you require.

Intuitive, graphical interface provides multi-OS support through a common console

HP Serviceguard Manager supports Linux and HP-UX clusters on a HP-UX, Linux or Windows console, allowing users to visually monitor, manage and administer clusters, nodes, packages and LAN. Intuitive color-coded icons will help quickly identify problems with the cluster so users can quickly react and resolve issues.

Toolkits for common applications speed deployment

Simple script templates designed specifically for widely used applications like NFS, Samba, Apache, MySQL and SendMail are available at no extra charge. Oracle toolkit is available for sale from <http://www.software.hp.com/>. Customers can easily customize configurations based on preferred cluster parameters and quickly install applications.

NOTE: This Web site is available in English only.

Unsurpassed control of infrastructure and business services at all levels

OpenView integrates Serviceguard Manager and Insight Manager to drill down to specific hardware events and root causes, delivering true end-to-end management from the hardware chassis to the business transaction. Serviceguard Manager can be launched from HP's Servicecontrol Manager 3.0, allowing customers already familiar with the multi-system management tool to continue to benefit from its power to manage systems with the new URL-based launch capability further extending the reach of Serviceguard for Linux.

HP Serviceguard Manager Capabilities

- Administration functions enable users to perform tasks including
 - Run, halt, or move a package (a logical group of applications and their resources), including moving a package via drag and drop
 - Run or halt a node or a cluster
 - Change node switching and package switching
- Easy-to-understand confirmation dialogues are provided to inform users about the consequences of administrative actions. Users are shown the specific Serviceguard command used and progress messages that track the ongoing administrative operation.
- Monitoring functions enable users to act on changing status:
- Color-coded, graphically-intuitive icons visually presentation topology, online status, and configuration information for multiple clusters, their member nodes, and packages
- Property sheets provide detailed information about clusters, nodes and packages monitored
- Auto-Refresh provides automatic updates, including the property sheets, and can be enabled or disabled; refresh intervals can also be tuned to user requirements
- Saving status and configuration "snapshots" enables user to perform support or analysis functions
- Dynamic scoping of clusters allows users to specify which clusters they want to monitor and administer
- Display clusters remotely from management stations running HP-UX, Windows, or Linux
- Comprehensive online help is available
- Ease of use minimizes training to remotely display clusters from multiple management stations running HP-UX 11.x, SuSE, Red Hat Linux 7.1 or later, Microsoft® Windows® NT® 4.0 (Service Pack 5 or later), Windows 2000 Professional Edition or Windows XP Professional Edition
- Ability to receive and view the most up-to-date cluster (SNMP) events from nodes monitored
- Flexibility of product allows it to be standalone or integrated with OpenView and Servicecontrol Manager

Product Highlights

HP Serviceguard For Linux ProLiant Cluster (305199-B22) Contents

- 2 software licenses
- Ethernet crossover cable
- 2 CDs with the following structure
 - 1 - Serviceguard Distributed Components CD
 - Serviceguard Manager software (HP-UX, Windows and Linux)
 - Serviceguard Manager Version A.03.00 Release Notes
 - Quorum Service software (HP-UX and Linux)
 - Quorum Server Version A.02.00 Release Notes
 - 2 - Serviceguard for Linux CD2 -
 - Serviceguard for Linux software (A.11.14)
 - Linux patches (Bonding - for Red Hat Advanced Server 2.1 only)
 - Getting Started with HP Serviceguard Version 11.14 for Linux
 - Managing HP Serviceguard for Linux
- HP Serviceguard for Linux Version 11.14 Release Notes
- " Documentation localized in English and Japanese

HP Serviceguard For Linux (307754-B22 or B9903BA) Contents

- 1 software license
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 - Serviceguard for Linux software (A.11.14)
 - Linux patches (Bonding - for Red Hat Advanced Server 2.1 only)
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 - Managing HP Serviceguard for Linux
- HP Serviceguard for Linux Version 11.14 Release Notes
- Documentation localized in English and Japanese

Specifications

Memory requirements	The memory requirement for Serviceguard for Linux depends on the number of packages configured in the cluster. The following equation provides a rough estimate of how much lockable memory is needed: Total memory = 6 MB 80 KB/package in cluster The total amount is needed on all nodes in the cluster, regardless of whether a given package or resource is on that node or not.
Application toolkits	Available for download at no additional charge are application toolkits for Apache, NFS, MySQL, Samba and SendMail, which are a separate set of shell scripts, and a binary file that allows you to configure Serviceguard packages that mount highly available networked file systems. Additional for fee toolkit is available for Oracle. You can modify the shell scripts for your specific environment. You cannot use Serviceguard toolkits without the associated applications. The application must be installed on your Linux system before you install, configure, and test your package. http://www.software.hp.com NOTE: This Web site is available in English only.
Operating system support	Red Hat Professional 7.3 (SCSI) Red Hat Advanced Server 2.1 (FC) SuSE Linux Enterprise Server 8 powered by United Linux 1.0 (FC)
Quorum service requirements	The Quorum Service provides cluster locking and must be installed and run on a system outside the cluster. The Quorum Service is a separate product provided on the "Serviceguard Distributed Components" CD. The node on which the Quorum Service is running must have network connectivity to the clusters for which it is providing services. Ensure that the connection with each node is independent of the cluster heartbeat connection so that both are not likely to fail at the same time. The Quorum Service is required for a 2-node configuration and recommended for a 3- to 4-node configuration. The Quorum Service in a Linux environment can manage up to 50 clusters and 100 nodes. The Quorum Service and clustered nodes may be on different subnets. Run on any HP PC or server certified for SuSE or Red Hat Professional 7.1 or above Minimum memory requirements 128Mb, or 192 Mb if Serviceguard Manager is running on the same system Locks up to 16Mb of memory Single quorum service for up to 100 nodes or 50 heterogeneous clusters
Serviceguard Manager	Enterprise cluster managed nodes ● MC/Serviceguard version A.10.10 or later ● Serviceguard OPS Edition A.11.01 or later ● At least one Serviceguard Cluster Object Manager (installed with MC/Serviceguard A.11.12 or later or Serviceguard OPS edition A.11.12 or later)
Management console	Will support one of the following three environments with both GUI and command line capability.

Specifications

HP-UX management station	Windows management station	Linux management station
HP-UX 11.0 or later	Windows NT 4.0 (Service Pack 5 or later), Windows 2000 Professional Edition	Red Hat Linux 7.1 (or later) and kernel version 2.4.2 (or later)
256 MB of available memory	Intel® Pentium processor, 200 MHz or higher	Intel Pentium II processor, 200 MHz or higher
65 MB of available hard disk space under /opt	128 MB of memory 150 MB of virtual memory	128 MB of memory
1 MB of additional hard disk space under /usr	25 MB of available hard disk space	100 MB of available hard disk space under /usr/local
1 MB of available hard disk space under /etc/opt/OV if HP OpenView has been installed	SVGA or higher-resolution video adapter (800 × 600 and 256 colors minimum)	15 MB of additional hard disk space available for log files created under /usr/local/sgmgr/log
15 MB of additional hard disk space under /var for log files	1 MB of available hard disk space if OpenView is installed	
	15 MB for log files when Serviceguard Manager is running	
	Up to 30 MB of additional disk space is required during the installation process	
NOTE: Serviceguard Manager: Serviceguard Manager does not require any patches, however the Serviceguard A.11.13 node that Serviceguard Manager connects to does need a COM patch if you want to have Serviceguard Manager Administration capabilities. If Serviceguard A.11.14 is used, then no COM patch is required.		

Supported Models

Servers

ProLiant DL360 G3
 ProLiant DL380 G2
 ProLiant DL380 G2 Package Cluster
 ProLiant DL380 G3
 ProLiant DL380 G3 Package Cluster
 ProLiant ML350 G3
 ProLiant ML370 G3
 ProLiant DL560 G1
 ProLiant DL580 G2

NOTE: This is a list of supported servers, some may be discontinued.

Quorum service
requirements

Smart Array Cluster Storage

201724-B21

Specifications

Mass Storage for Fibre Channel	HP StorageWorks VA7100	A6261A/AZ/AE
		A6262A/AZ/AE
		A6263A/AZ/AE
	HP StorageWorks VA7110	A7294A/AZ/AE
		A7295A/AZ/AE
		A7296A/AZ/AE
	HP StorageWorks VA7400	A6264A/ZA/AE
		A6265A/AZ/AE
	HP StorageWorks VA7410	A6267A/AZ/AE
		A6268A/AZ/AE
	HP StorageWorks Enterprise Virtual Array 3000	335620-B21
	HP StorageWorks Enterprise Virtual Array 5000	309620-B21/-B22
	HP StorageWorks XP48	A5920A
	HP StorageWorks XP128	A7875A
	HP StorageWorks XP512	A5950A
	HP StorageWorks XP1024	A7905A

NOTE: Some of the storage subsystems listed above may be discontinued; however, they are still supported. Disk drives: Any drive supported in the selected storage subsystem.

Switches and hubs supported on selected disk array

NOTE: Please contact your HP Storage representative for the latest firmware revision for switch connectivity support on Linux.

Fibre Channel switches	HP StorageWorks fca2214 Host Bus Adapter for Linux	281541-B21
	Emulex Fibre Channel PCI host bus adapter; models LP952, LP982, LP8000-F1, LP9000-N1, LP9002L-F2	

NOTE: The Emulex driver is delivered in arbitrated-loop mode. If switches are set in fabric mode, then the driver parameters need to be changed to match. This is documented at the Emulex Web site: <http://www.emulex.com/>. To find the detailed instructions select "Drivers, software, and manuals" under quicklinks. Then select by operating system: Linux, and on that page select Fibre Channel drivers. Select "configure driver" for the appropriate driver version. This document details how to change the various parameters.

NOTE: This Web site is available in English only.

FiFibre Channel host bus adapters	Emulex Fibre Channel PCI host bus adapter; models LP952, LP982, LP8000-F1, LP9000-N1, LP9002L-F2	
	NOTE: The Emulex driver is delivered in arbitrated-loop mode. If switches are set in fabric mode, then the driver parameters need to be changed to match. This is documented at the Emulex Web site: http://www.emulex.com/ . To find the detailed instructions select "Drivers, software, and manuals" under quicklinks. Then select by operating system: Linux, and on that page select Fibre Channel drivers. Select "configure driver" for the appropriate driver version. This document details how to change the various parameters.	

NOTE: This Web site is available in English only.

Networking	HP Serviceguard for Linux supports redundant networks, even though these are not shown in the diagrams. The redundant client network connections allow local failover from one NIC to another in case of failure in the network path. These connections must be on the same subnet. This is implemented using Channel Bonding. Failover from one NIC to another prevents a package, or the entire system, from failing over to another system. This minimizes impact to the application and to the users.	
	Integrated NICs on any supported server	
	PCI add-in NICs supported:	
	Compaq NC3134 Fast Ethernet NIC 64 PCI Dual Port 10/100	138603-B21
	Compaq NC6136 Gigabit Server Adapter, 64-bit/66-MHz, PCI, 1000 SX	203539-B21
	Compaq NC7770 PCI-X Gigabit Server Adapter	244948-B21

Specifications

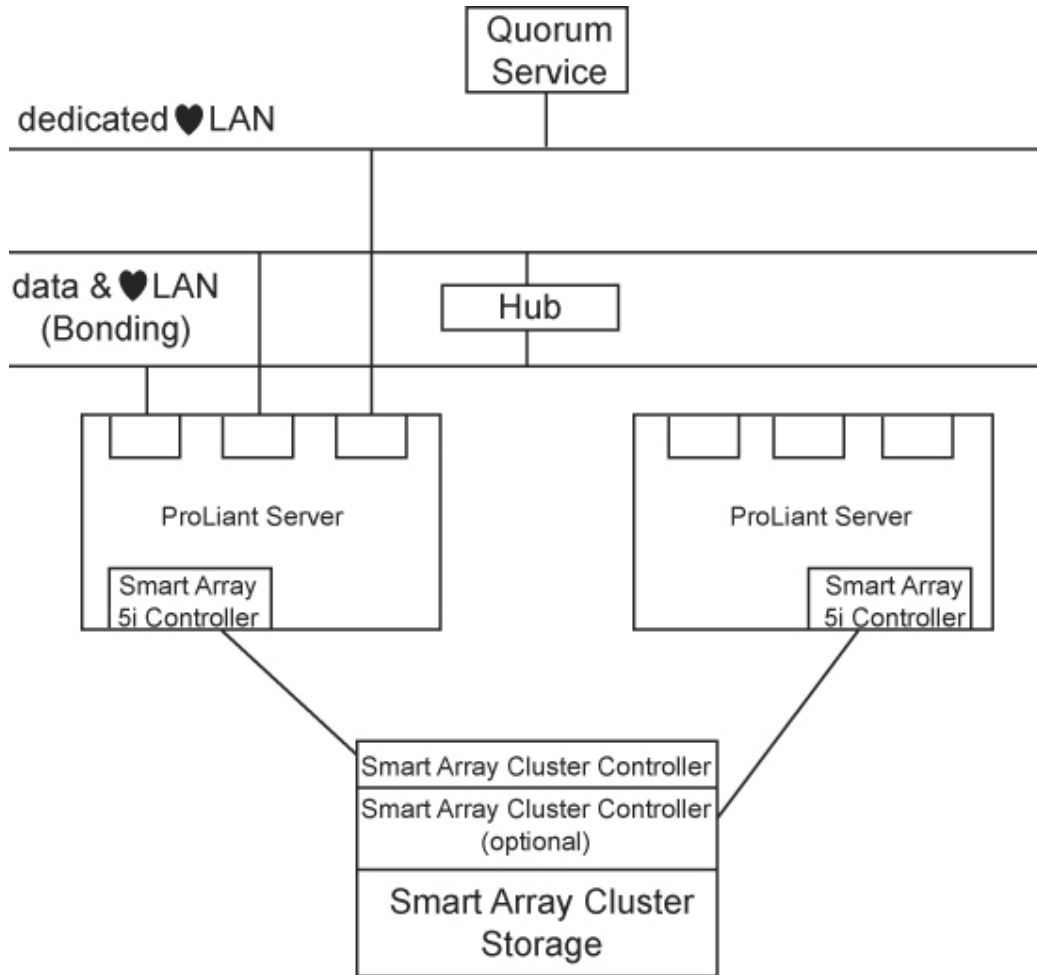
SCSI configuration topology

Use the ProLiant configuration tools to find the appropriate part numbers.

A hub is necessary to connect the two client LANs. The customer must then connect the client LANs to the remainder of their network infrastructure.

What is critical is the number of LAN connections and the SCSI connection to the Smart Array-Cluster Storage. There needs to be a minimum of 2 LAN connections per server configured in a bond and used for both heartbeat and data, whereas the recommended configuration includes 3 LAN connections per server (1 heartbeat and 2 public) with bonding and 1 SCSI adapter connection to the Smart Array-Cluster Storage. Integrated LANs may be used when possible.

This is HP's recommended cluster configuration for SCSI with a redundant network for data.



SCSI configuration topology

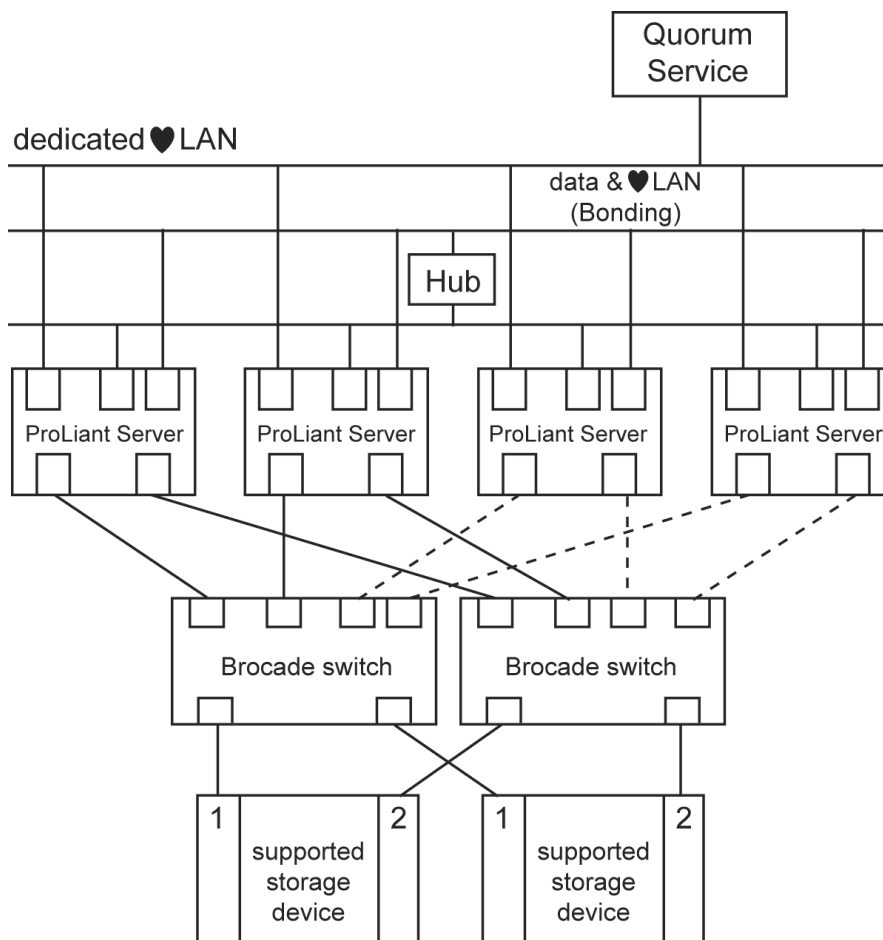
- Up to 16 nodes are supported in a fibre channel configuration
- A quorum service is only required for two node configurations, it is optional for three to eight node configurations.
- LAN connection to switches white papers are available on the Procurve section of the HP Web site (<http://www.hp.com/rnd/index.htm>), describing how to set up the LAN environment for the best availability.
- The key items that need to be in the servers are the correct number and type of LAN connections and the Fibre Channel host bus adapters (HBAs). Various supported Fibre Channel HBAs are used in this example.

NOTE: The Fibre Channel HBAs are not available directly from HP. These must be ordered from the reseller.

NOTE: This Web site is available in English only.

This is HP's recommended cluster configuration for Fibre Channel with a redundant network for data.

Specifications



Disaster-tolerant solution for Linux

- HP's metropolitan cluster for Linux is an integrated solution, utilizing HP Serviceguard for Linux and the Cluster Extension XP software (CLX) for the HP XP disk arrays, product number B9534A.
- CLX is host-based software that integrates Continuous Access (CA) XP remote mirroring with Serviceguard failover/failback operations.
- Integrating CLX with Serviceguard for Linux allows application packages to automatically fail-over:
 - Among local nodes that are attached to the same XP series array.
 - Between one system that is attached locally to its XP frame and another remote node that is attached locally to another XP frame.

Specifications

Cluster topology and geography with Cluster Extension XP

- The current maximum number of nodes supported is eight. A Quorum Service node is required to provide arbitration to clusters in a CLX configuration. It provides arbitration services for the cluster when a cluster partition is discovered. A node running the Quorum Service cannot be a member of any cluster to which it is providing cluster quorum services.
- The recommended configuration implements two data centers with the nodes of the cluster split equally between them and a third site housing the Quorum Service.
- The minimum supported configuration is two data centers, with one of the data centers housing the Quorum Service. In this configuration, if the data center housing the Quorum Service is down, the nodes in the second data center will not be able to form the cluster, as there is no quorum. At the minimum, the Quorum Service should be in a separate room with its own power circuit.
- The maximum distance between the data centers is currently limited either by the maximum distance supported for the networking type or by the CA link being used, whichever is shorter-but no more than 100 kilometers.
- DWDM (Dense Wave Division Multiplexing) device can be used for the network and data replication links to increase the distance up to 100 kilometers between data centers.

Cluster networking links with Cluster Extension XP

- The supported network interfaces used for cluster heartbeat are 10Base-T and 100Base-T.
- There must be less than 200 milliseconds of latency in the cluster heartbeat network between the data centers.
- No routing is allowed for the cluster heartbeat network between the data centers.
- There must be at least two alternately routed cluster heartbeat links between the data centers to prevent the "backhoe problem". The "backhoe problem" can occur when all cables are routed through a single trench and a tractor on a construction job severs all cables, disabling all communications between the data centers.
- One of the heartbeat links has to be a dedicated link. The other heartbeat link can be shared with the application network link.

Data replication continuous access (CA) links

There must be at least two alternately routed CA links between the two primary data centers.

NOTE: The maximum distance between the two primary data centers is currently limited either by the maximum distance supported for the cluster networking type or by the CA link being used, whichever is shorter.

DWDM links for both networking (cluster heartbeat and application network) and CA

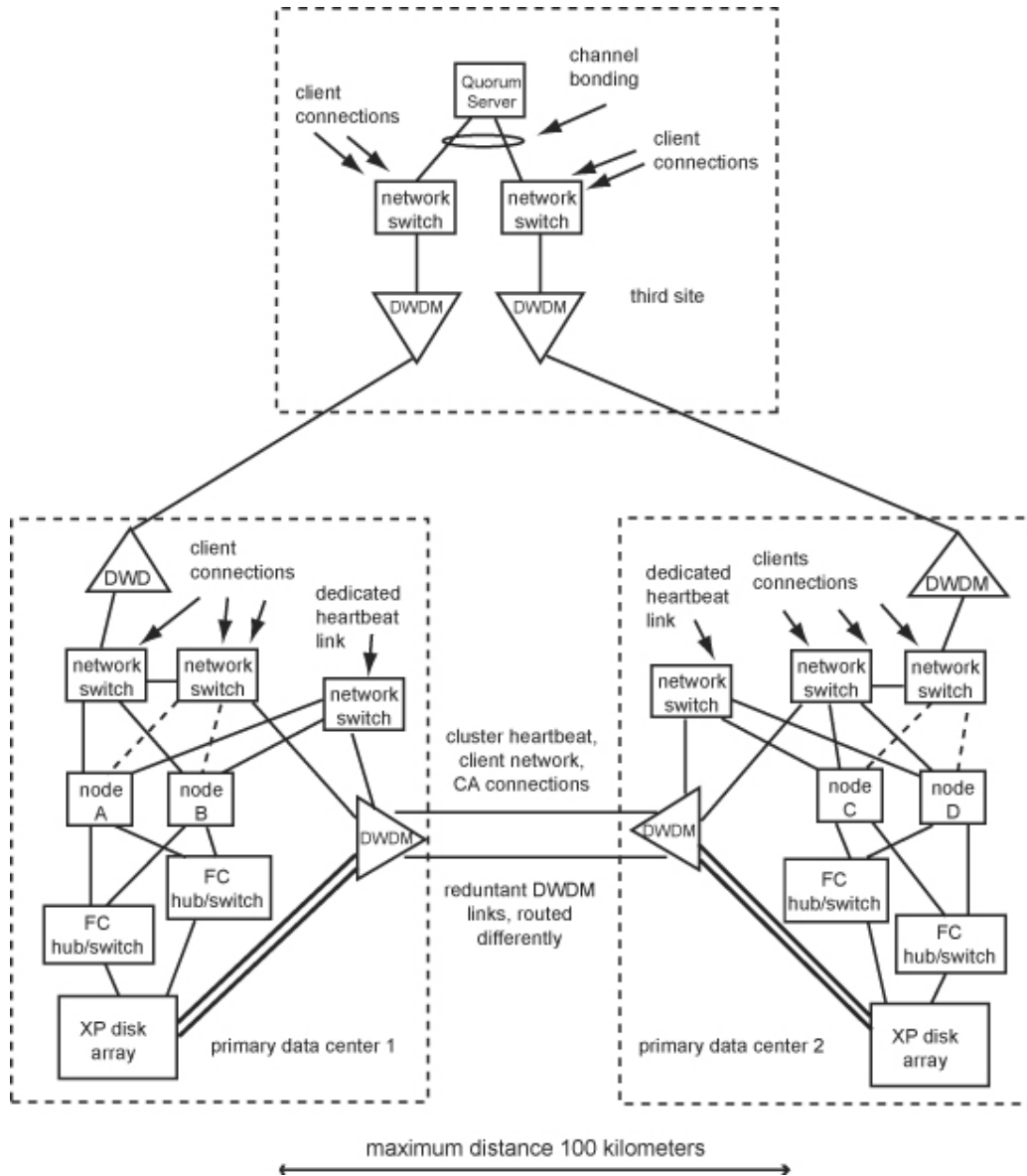
- The maximum distance supported between the data centers for a DWDM configuration is 100 kilometers.
- Both the networking (cluster heartbeat and application network) and CA links can go through the same DWDM box. A separate DWDM box is not required.
- The fiber-optic links between the DWDM boxes must be "dark fiber" links, non-switched circuits. There must be two alternately routed links between the two primary data centers.
- For the highest availability, it is recommended to have two separate DWDM boxes (in each data center) used for the links between each data center. However, since most DWDM boxes are typically designed to be fault tolerant, it is acceptable to use only one DWDM box (in each data center) for the links between each data center. If a single DWDM box is used, a minimum of one active and one redundant standby fiber link feature of the DWDM box must be configured. When using ESCON for CA, note that the ESCON timeout is shorter than the DWDM link failover time. Therefore, a minimum of two active fiber links on the DWDM box must be configured.

Quorum service

- With only one IP address configurable for a Quorum Service, it is suggested to configure the LAN used for the Quorum Service IP address with two or more physical LAN cards using Channel Bonding to improve the availability of the Quorum Service if a LAN card failure occurs. A node running the Quorum Service cannot be a member of any cluster to which it is providing cluster quorum services.
- The Quorum Service can provide arbitration services for up to 50 heterogeneous clusters or 100 cluster nodes.

Recommended configuration with two data centers and the Quorum Server in a third location.

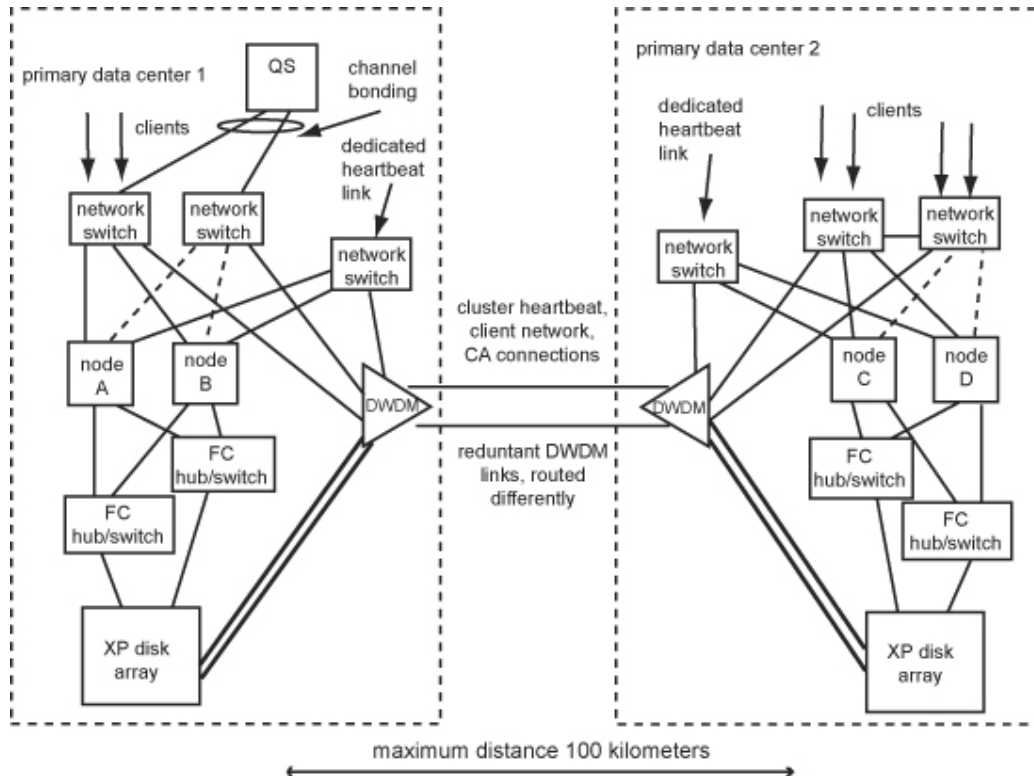
Specifications



In the example above, the DWDM boxes connected between the two Primary Data Centers are configured with multiple dark fibre links. The DWDM links are used for both networking and CA data replication. If the DWDM box is fault tolerant, only one is required in each data center. If it's not fault tolerant, two are required in each data center. The Quorum Service site distance can be up to 100 kilometers away from either Primary Data Center since DWDM links are also used. The Quorum service can be on a different subnet than the cluster. It is also supported to connect to the Arbitrator data center without DWDM links, as long as the distance is within the allowed specifications for the network type being used.

Minimum supported configuration with two data centers below.

Specifications



In the example above, the Quorum Service is in data center 1. Note that if data center 1 is down, the cluster nodes in data center 2 will not be able to form a new cluster. Therefore, this configuration is not recommended.

Software requirements

The solution required the following software versions:

- Red Hat Advanced Server 2.1
- HP Serviceguard for Linux Version A.11.14.02
- Quorum Server Version A.01.01
- RAID Manager XP Version 01.09.02 or later
- HP Cluster Extension XP for Serviceguard for Linux Version 1.03.00
- HP Continuous Access XP
- Emulex FC driver 4.20i or later
- HP Linux Disaster Recovery Data Replication Enabler

Download from http://www.software.hp.com/HA_products_list.html

NOTE: This Web site is available in English only.

For more information

For more information regarding this solution, go to:

http://www.hp.com/products1/storage/products/disk_arrays/xpstorgesw/cluster/index.html

To learn more about HP's other high availability products and solutions, please visit:

<http://www.hp.com/products1/unix/highavailability/>

NOTE: These Web sites are available in English only.

Serviceguard for NAS 8000

HP expands its existing network-attached storage (NAS) offerings and continues to deliver industry-leading storage solutions with the release of its new NAS 8000 series of solutions designed to provide scalable, easy-to-manage, heterogeneous NAS solutions for its VA and XP arrays, as well as NAS integration into its SAN solutions for flexible file-sharing. These solutions offer a NAS-optimized OS for file serving and cluster technology from Serviceguard for mission-critical needs.

For more information regarding this solution, go to: <http://www.hp.com/products1/storage/nas/8000/index.html>

NOTE: This Web site is available in English only.

Specifications

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